Before the
Federal Communications Commission

In the Matter of	)	
	)	
Recommendations of the Advisory	)	
Committee for the 2007	)	Re: IB Docket No. 04-286
World Radiocommunication	)	
Conference	)	

To: The Commission

COMMENTS OF AEROSPACE AND FLIGHT TEST RADIO COORDINATING COUNCIL

Aerospace and Flight Test Radio Coordinating Council ("AFTRCC"), by its attorneys, hereby submits its Comments on Public Notice, DA 05-2481 (September 21, 2005). In particular, AFTRCC comments in support of the preliminary view (WAC Document 064) concerning Agenda Item 1.5.

Background

AFTRCC is a trade association for the nation's principal aerospace manufacturers. In this capacity AFTRCC serves as the spectrum advocate for the aerospace industry on matters affecting flight test spectrum. This fundamental mission was at the heart of AFTRCC's formation nearly 50 years ago. Among its many accomplishments in this regard is AFTRCC's role in helping lead efforts which resulted in the allocation of L- and S- spectrum bands for telemetry.

As the Commission's records reflect, AFTRCC is also the certified Non-Federal Government coordinator for use of the shared, Government/Non-Government spectrum allocated for flight testing. AFTRCC works closely with Government Area Frequency Coordinators, who are responsible for Federal Government use of the spectrum, in an

effort to ensure that interference-free operation is protected, and hence flight test safety maximized.

The Public Notice seeks comment concerning documents approved by the Commission's World Radiocommunication Conference Advisory Committee ("WAC"). The WAC document of interest here is WAC/064 which sets forth revised preliminary views of the United States regarding Agenda Item 1.5.

The Agenda Item looks toward allocating additional spectrum for flight test telemetry (or "aeronautical mobile telemetry" in the parlance of the International Telecommunications Union). It seeks to redress a serious and growing shortfall in the spectrum available for this purpose. The shortfall is driven by the rapidly increasing data rates associated with the flight testing of modern aircraft. The shortfall is exacerbated by the fact that nearly one-third of the telemetry spectrum inventory has been reallocated to other purposes over the last 15 years.

WAC/064 represents an update of the preliminary view approved by the United States last year. The updates essentially address three issues.

First. It addresses the importance of securing additional spectrum which is, to the maximum extent possible, harmonized internationally.

Second. It offers certain preliminary thoughts as to how the Agenda Item might best be satisfied from a regulatory perspective. The revised preliminary view notes that one approach, among others, is the designation of existing mobile service spectrum as being available for this purpose -- without establishing a priority for telemetry as against other co-primary services.

Third. It sets forth aspects of U.S. thinking concerning the configuration of any newly added spectrum, e.g. the notion that the spectrum would be used for downlinks, and would not be used for safety-related communications (thus minimizing constraints on other co-primary services).

Discussion

AFTRCC vigorously supports the views expressed in WAC/064. AFTRCC helped formulate the original preliminary view as well as the recent update. It helped advocate the draft during the meetings of WAC Industry Working Group-1. It adjusted the language in order to take into account the views of other parties. It should come as no surprise, therefore, that AFTRCC continues to support it.

However, AFTRCC also wishes to take this opportunity to underscore the importance of success on this Agenda Item for the U.S. aerospace industry.

A. Flight Test Trends

Telemetry spectrum is an enabler for aerospace development. Aeronautical telemetry transmits real-time data from the test vehicle, enabling pilots and ground-based engineers to conduct safe, effective, and efficient missions.

Over the last 30 years, measurements collected during flight-testing have been rapidly increasing. While there are a number of contributing factors, one of the most significant is the increasing complexity of the aircraft. When coupled with ongoing advances in aerodynamics, fuels, and other technologies, it creates ever more challenging test environments. Those environments require greater amounts of measurement data in order to determine if the system(s) perform as designed. In addition, more and more systems on-board an aircraft must share data. Each system need not acquire 'airspeed' in

order to perform its mission: 'Airspeed' is acquired once and passed to the various systems that need it. With today's aircraft, moving volumes of data can require anywhere from a single avionics bus to a hundred. Each of these busses needs to be monitored and verified to ensure that the data is flowing where and when it should.

Digital video cameras are becoming increasingly practical for flight test use, and represent another data source. For example, when trying to show pilot workload during flight, cameras can show engineers on the ground what the pilot sees, and how he or she is reacting to the various gauges, warning lights, and other stressful situations.

Finally, modern aircraft are designed to operate closer to the point of maximum efficiency, a point which is also closer to the edge of instability. For example, winglets and non-circular engine nacelles are more efficient, but much more precision is required to ensure that the design is correct; use of layered composites in wings greatly increases the number of parameters that must be tested; and certification of wide-body, twin-engine passenger aircraft for extended range, single-engine operation on over-water routes requires an even higher level of test rigor and fidelity. Airline passengers take these and other advances for granted. But absent much more extensive flight-testing, such advances would not be feasible.

In the 1950s, flight-testing a typical new commercial airliner could be completed with a few hundred measurements. Forty years later, flight-testing of one new commercial aircraft generated many thousands of measurements. Not only was the sheer number of measurements vastly increased, but also they were taken with much greater frequency and precision.

Given the increase in measurements, data rates have also increased. In general, the amount of instantaneous data collected today requires a much higher data rate than in years past. Sophisticated electronics likewise require more precision and resolution than in previous years. Sensors today convert their analog inputs into digital outputs using 12, 16 and sometimes 32 bits per sample; 20 years ago, 8 or 10 bits per sample was common. With more capable computers processing the data, the requirements for the accuracy of timing resolution have also increased. Where once 10 milliseconds was the norm, most systems today require 1 microsecond. This represents a change of four orders of magnitude. Aeronautical engineers are considering the need to improve time accuracy to the 1-nanosecond level. Certification of next generation commercial aircraft will require data rates in the 100 to 200 Mbps range.

As the number of measurement points and accuracies have increased, the flight-test community has been increasingly constrained by the lack of sufficient AMT spectrum. The amount of data that can be telemetered for real-time monitoring now represents a steadily decreasing percentage of the total measurements needed for the test. This entails greater risk to pilots and ground personnel. It also extends the length of each flight test program, increasing the cost of aircraft certification, slowing time to market, and increasing the overall cost of aircraft.

B. The Cost of Delays

Significant resources are devoted to flight-testing, including support equipment, personnel, and range costs. Furthermore, a one-day delay in testing may cause a delay of several additional days due to unavailability of all of the required resources and assets

(e.g., chase aircraft, equipment calibration, range availability and, most notably, spectrum), which must be re-scheduled.

Thus, test delays entail significant financial penalties. In one congested area nearly 20 percent of test flights are delayed for lack of spectrum. While the cost varies from program to program, the cost for a major program can exceed hundreds of thousands of dollars per hour. While costs for flight-testing a new corporate jet are less than a commercial airliner, time is money; delays represent a material adverse event in certifying the craft's airworthiness and delivering it to the customer regardless of the type of aircraft. This in turn can mean lost sales.

C. Global Competition

It is no secret that US manufacturers are under increasing pressure from foreign competition. The US share of the commercial airliner market has declined from 85 percent in 1990 to 47 percent today.[1] This competition will intensify. In an environment such as this it is imperative that American manufacturers have the spectrum resources necessary to help reduce costs and offer customers new economies in aircraft operation and maintenance.

Allocation of additional spectrum harmonized as much as possible will help this situation in two ways. First, it will enable manufacturers to shorten the flight test process by capturing more data for each flight: Instead of requiring the aircraft to return upon completion of tests for just a few data points, manufacturers will be in a position to have the crew proceed to multiple, successive test points on one flight.

Moreover, by securing WRC approval for a short list of bands as available for telemetry, manufacturers will be able to offer their customers, national airlines, corporate

[1] Source: Speed News Aircraft Fleets and Statistics (www.speednews.com/lists)

jet, and general aviation, common test equipment which is much more flexible and economical in terms of maintenance and repair.

Conclusion

In summary, AFTRCC urges adoption of the preliminary view by the Commission. It is an important step on the difficult road to success at the WRC.

Respectfully submitted,

AEROSPACE AND FLIGHT TEST
RADIO COORDINATING COUNCIL

By 
William K. Keane

Duane Morris LLP
1667 K Street NW
Suite 700
Washington, D.C. 20006
(202) 776-5243
Its Counsel

October 3, 2005